Fermilab *Fermi National Accelerator Laboratory*

Technical Division-Machine Shop

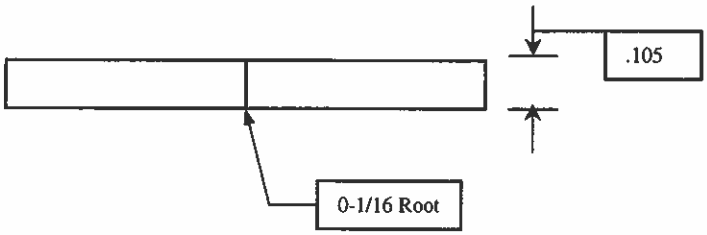
Welding Procedure Specification

Welding Procedure Specification No.: Fermi WPS SS-2-001			**Date:** 1/15/2010
Revision No.: R-1	**Revision Date:** 8/31/2010	Remarks: Revised amperage & voltage range, added 1/16Ø to Tungsten Electrode. Correction of errata	**Supporting PQR No.(s):** *Fermi PQR SS-2-001*
Welding Processes:	(1)Type: GTAW/Manual	(2)Type:	
(Manual, Automatic, Machine, Semi-automatic)			

Joints (QW-402):			
Joint Design: Square Groove	**Backing:** Gas	**Backing Material (Type) Root:** Argon Gas	~~**Remainder:**~~
Retainer: Yes ~~*** No~~	**Type:** ~~Non Metallic *** Metallic (Non-fusing~~		

Joint Details:

SA 240 Type 304 Plate 1 G



#6 gas cup 3/32Ø EWTh-2

Base Metals (QW403):	P-No.: *8, Gp. 1*	To	P-No.: *8, Gp. 1*
Specification Type and Grade:	SA 240 Type 304		
TO Specification Type and Grade:	SA 240 Type 304		
OR Chemical Analysis and Mechanical Properties:			
TO Chemical Analysis and Mechanical properties:			

Thickness Range:	**Process 1**		**Process 2**	
Base Metal:	Groove: .105"-.210"	Fillet: Unlimited	Groove:	Fillet:
Deposited Weld Metal:	Groove: .105"-.210"	Fillet: Unlimited	Groove:	Fillet:
Pipe Diameter Range:	Groove: 2.875" Minimum	Fillet: Unlimited	Groove:	Fillet:
Other:				

Filler Metals (QW-404)	Process 1		Process 2	
Specification No. (SFA):	Autogenous No Filler			
AWS No, (Class):				
F-No.:				
A No.:	8			
Size of Filler Metals:				
Deposited Weld Metal Thickness Range:	Groove: 105"-210" Groove: .105"-.210"	Fillet: Unlimited Fillet: Unlimited	Groove:	Fillet:
Electrode-Flux (Class):				
Flux Trade Name:				
Consumable Insert:				
Other:				

Each Base Metal-Filler Metal Combination should be recorded individually

Use of Fermilab Welding Procedures and Welder Qualifications for non-Fermilab work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save Fermilab and the government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by reason of Subcontractor's and their employees possession and use of Fermilab procedures and qualifications.

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Positions (QW-405)		Post Heat Treatment (QW-407)	
Positions of Groove:	1 G Flat	Temperature Range:	None
Welding Progression		Time Range	N/A
Positions of Fillet	All		

Preheat (QW-408)		Gas (QW-408)			
				% Composition	
Preheat Temperature:	Minimum 50° F		Gases	Mixture	Flow Rate
Interpass Temperature:	Maximum-Not Recorded	Shielding	Argon	99.9%	15-20 CFH
Preheat Maintenance:	None	Trailing	None	***	***
Minimum Welding Temperature	50° F	Backing	Argon	99.9%	15-20 CFH

Electrical Characteristics (QW-409)					
Current – AC or DC:	Direct Current	Polarity:	Straight	Characteristics	Non-Pulsing
Tungsten Electrode:	Size: 1/16"Ø –3/32"Ø **		EWTh-2		
Mode of Metal Transfer for GMAW:	N/A				
Electrode Wire Feed Speed Range:	N/A				

Technique (QW-410)	
String or Weave Bead:	String
Orifice or Gas Cup Size:	#5 or #6 Gas Lens
Initial Interpass Cleaning (Brushing, Grinding, etc.):	Initial Solvent Clean***Wire brush/file burrs if present
Method of Back Gouging:	None
Oscillation: None	
Contact Tube to Work Distance:	N/A
Multiple or Single Pass (per side):	Single
Multiple or Single Electrode(s):	Single
Travel Speed (Range):	As Required/see sequence chart
Peening:	None
Other:	

Sequence Chart:

Weld Layers	Processes	Filler Metal Class	Filler Metal Ø	Current Type Polarity	Current Amperage Range	Voltage Range	Travel Speed Range	Other (Power Source) (Special Requirement)
1 Final	GTAW	Autogenous		DCEN	65-95*	10-15*	As Required	Miller Dynasty DX #4173 Power Source with Remote Foot Pedal Control Maintain Argon coverage on back side throughout weld-Use alignment and purge fixture

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